AF/2661

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Re: Appeal to the Board of Patent Appeals and Interferences

In re PATENT application of
KRISHNA et al.

Application No. 09/637,015

Filed: August 14, 2000

Group Art Unit: 2661

Examiner: Moore, Ian

Docket: 95-319

Title: Apparatus And Method For Identifying Data Packet At Wire Rate On A Network Switch Port

Date: July 15, 2004

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1 ☐ **NOTICE OF APPEAL**: Applicant hereby appeals to the Board of Patent Appeals and Interferences from the decision (not Advisory Action) dated March 5, 2004 of the Examiner twice/finally rejecting claims 1-18

2 ☒ **BRIEF** on appeal in this application attached in triplicate.

3 ☐ An **ORAL HEARING** is respectfully requested under Rule 194 (due two months after Examiner's Answer – unextendable).

4 ☐ Reply Brief is attached in triplicate (due two months after Examiner's Answer – unextendable).

5. **FEE CALCULATION**:		Large/Small Entity	
If box 1 above is X'd, see box 12 below first and decide: . . . . . enter		$330/165*	$
If box 2 above is X'd, see box 12 below first and decide: . . . . . enter		$330/165*	$ 330.00
If box 3 above is X'd, see box 12 below first and decide: . . . . . enter		$290/145*	$
If box 4 above is X'd, ... enter nothing		- 0 - (no fee)	
6. Original due date: July 19, 2004			
7. **Petition is hereby made** to extend the original due date to cover the date this response is filed for which the requisite fee is attached	(1 mo) $110/$55 (2mos) $420/$210 (3mos) $950/$475 (4mos) $1480/$740		
8. Enter any previous extension fee paid [ ] previously since above original due date (item 6); [ ] with concurrently filed amendment		-	
9. **Subtract line 8 from line7 and enter: Total Extension Fee**			+
10. **TOTAL FEE ATTACHED =**			**$ 330.00**

11. ☐ *Fee NOT required if/since paid in prior appeal in which the Board of Patent Appeals and Interferences did not render a decision on the merits.

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order No. 50-0687 / 95-330 for which purpose a duplicate copy of this sheet is attached. **This CHARGE STATEMENT does not authortze charge of the issue fee until/unless an issue fee transmittal form is filed.**

Atty: E. Stemberger
Edward J. Stemberger
Reg. No. 36,017
Tel: (202) 261.1014
Fax: (202) 887-0336

Customer No. 20736

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: KRISHNA et al

Examiner: Moore, Ian

Application No.: 09/637,015

Group Art Unit: 2661

Filed: August 14, 2000

Docket: 95-319

For: Apparatus And Method For Identifying
Data Packet At Wire Rate On A Network Switch Port

Date: July 15, 2004

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection of claims 1-16 of the above-identified application.

This Appeal Brief is submitted in triplicate as required by 37 C.F.R. § 1.192 (a).

1. Real Party in Interest:

This application is assigned to Advanced Micro Devices Inc., the real party of interest.

2. Related Appeals and Interferences:

There are no other appeals or interferences known to Appellant that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. Status of Claims:

Claims 1-16 are pending in this application. Claims 1-16 stand rejected by the Examiner.

4. Status of any Amendment Filed Subsequent to Final Rejection:

A Rule 116 Amendment was filed in response to the final rejection and was not entered by the Examiner.

5. Summary of Invention

The invention relates to a method that enables a network switch to provide layer 2 switching and layer 3 switching capabilities with minimal buffering within the network switch that may otherwise affect latency of switched data packets.

Thus, the invention of claim 1 is directed to a method of evaluating an incoming data packet at a network switch port. The method includes storing a plurality of templates configured for identifying respective data formats, each template having at least one min term configured for comparing a corresponding prescribed value to a corresponding selected byte of the incoming data packet (page 6, line 17 to page 7, line 7). The min terms that correspond to the selected byte are simultaneously compared to

the selected byte, immediately upon receipt of the selected byte by the network switch port (page 8, lines 3-10 and page 8, lines 20-22). A comparison result that identifies the incoming data packet is generated, based on the comparisons of the min terms to the data bytes of the entire packet received by the network switch port (page 6, lines 8-11). A frame tag is generated based on the comparison result as soon as a last bit of the data packet is received at the network switch port (page 8 lines 11-18).

The invention of claim 2 is that the simultaneously comparing step includes loading the min terms corresponding to a first of the data bytes into a min term generator; comparing in parallel the min terms loaded in the min term generator with the first of the data bytes; and outputting comparison results for the min terms loaded in the min term generator to an evaluation core (page 8, lines 3-14).

The invention of claim 3 is that the simultaneously comparing step further includes loading the min terms corresponding to a second of the data bytes, contiguously following the first of the data bytes, into the min term generator (page 8 lines 7-10).

The invention of claim 4 further comprises outputting the frame tag to a switch fabric configured for selectively switching the incoming data packet based on the corresponding frame tag (page 8, lines 17-19).

The invention of claim 5 is that the storing step includes storing each min term in a memory as a table entry, each table entry having a location in the memory based on a location of the corresponding selected byte in the incoming data packet (page 7, lines

8-17), the table entry including a min term portion specifying the corresponding prescribed value and a comparison operator field, and an evaluation portion having an equation identifier field that specifies the templates that use the corresponding min term (page 9, lines 9-29).

The invention of claim 6 is that the generating step includes temporarily storing results of the comparisons of the min terms to the selected bytes of the incoming data packet; detecting at least one matched template from the plurality of templates based on the results of the comparisons of the min terms; and generating the comparison result based on the detected at least one matched template (page 10, lines 12-17).

The invention of claim 7 further includes resolving a priority of templates to one final frame tag when more than one template matches the incoming data packet (page 8, lines 27-30).

The invention of claim 8 is that the first of the data bytes corresponds to a first of the data bytes of a packet having a prescribed format, the simultaneously comparing step including evaluating the selected data byte relative to a beginning of the packet having the prescribed format (page 7, lines 31-33).

The invention of claim 9 is that the prescribed format is Internet protocol (IP) format (page 7, lines 31-33).

The invention of claim 10 is that the step of generating the comparison result based on the detected at least one matched template includes identifying for each of the min terms compared with the incoming data packet a corresponding equation, each

equation specifying a unique result for a selected group of the templates; and generating the comparison result by the equation having the detected at least one matched template (page 6, lines 8-15).

The invention of claim 11 is a network switch port filter configured for evaluating an incoming data packet. The filter includes a min term memory configured for storing min term values, each min term value stored based on a location of a corresponding selected byte of the incoming data packet for comparison (page 8, lines 31-33), a min term portion specifying a corresponding comparison operation, and an equation identifier field that specifies templates that use the corresponding min term (page 9, lines 9-27); a min term generator configured for simultaneously comparing a byte of the incoming data packet, immediately upon receipt of the incoming data byte, with the min terms that correspond to the received byte and generating respective min term comparison results (page 8, lines 3-10); and an equation core configured for generating a frame tag identifying the incoming data packet based on the min term comparison results relative to the templates (page 8, lines 11-19).

The invention of claim 12 further includes a frame identifier configured for identifying a type of layer 2 packet, the selected byte of the incoming data packet determined based on the identified type of layer 2 packet (page 7, lines 20-24).

The invention of claim 13 is that the location of each stored min term value is relative to a beginning of an IP frame within the layer 2 packet (page 7, lines 31-33).

The invention of claim 14 further includes a min term controller configured for fetching the min terms from the min term memory corresponding to a selected byte of the IP frame within the incoming data packet (page 7, lines 23-26).

The invention of claim 15 is that the equation core generates the frame tag at a wire rate of the incoming data packet and prior to an end of the incoming data packet (page10, lines 28-31).

The invention of claim 16 further includes a tag priority device configured for resolving a priority of templates to one final frame tag value when more than one template matches the incoming data packet (page 8, lines 27-30).

6. Issue

Whether claims 1-6, 8-9, and 11-15 are patentable under 35 U.S.C. 102(e) as not being anticipated by Deb (US 6,172,990) and whether claims 7 and 16 are patentable under 35 U.S.C. 103(a) as not being obvious from Deb in view of Connery (US 6,570,884), and whether claim 10 is patentable under 35 U.S.C. 103(a) as not being obvious from Deb in view of Bellenger (US. 5,802,054).

7. Grouping of Claims:

With regard to the rejections claims 1-10 stand or fall together; and claims 11-16 stand or fall together.

8. Arguments

Claims 1-6, 8-9, and 11-15 are patentable under 35 U.S.C. §102(e) as not being anticipated by Deb and claims 7 and 16 are patentable under 35 U.S.C. 103(a) as not being obvious from Deb in view of Connery, and claim 10 is patentable under 35 U.S.C. 103(a) as not being obvious from Deb in view of Bellenger.

In the final Office Action, the Examiner rejected claims 1-6, 8-9 and 11-15 under 35 U.S.C. §102(e) as being anticipated by Deb. The claimed invention is not taught or suggested by Deb for the following reasons.

With regard to claim 1, Applicants submit that Deb neither discloses nor suggests simultaneously comparing min terms to the selected byte immediately upon receipt of the selected byte by the network switch port, and generating a frame tag based on a comparison result as soon as a last bit of the data packet is received at the network switch port.

The claimed feature of simultaneously comparing, to the selected byte, the min terms that correspond to the selected byte immediately upon receipt of the selected byte by the network switch port is described in the specification at page 7. Page 7, lines 10-23 describe that each min term is configured to identify whether a selected byte of the data frame matches a prescribed value. The min terms are arranged within associated templates in a prescribed order that corresponds to the relative position of a data byte in the incoming data stream to enable simultaneous comparisons between the incoming data packet and the min terms. Hence, an incoming data packet can be

compared to multiple templates to determine not only the data format of the incoming packet, but also what action needs to be performed by the switch fabric.

Applicants attach as an Appendix, a description of Gate Logic and direct the reader to page 6 thereof, where min terms are defined in the art. Min terms utilize simple AND/OR logic that facilitates the claimed simultaneous comparisons.

It is submitted that the Examiner's interpretation of "min term" cannot be so unreasonably broad as to be inconsistent with the specification or the interpretation applied in the art. Hence, "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their 'broadest reasonable interpretation.'" MPEP § 2111.01 at 2100-37 (Rev. 1, Feb. 2000) (quoting In re Marosi, 218 USPQ 289, 292 (Fed. Cir. 1983) (emphasis in original)).

Deb simply does not disclose or suggest the use of min terms for simultaneous comparisons of an incoming data stream. Deb employs a complex executable microcode defining a type of data structure to be built from the received packet data. Applicants submit that the micro-RISC stream processor 114 must perform sequential execution of instructions, and cannot simultaneously compare the selected byte to the min terms that correspond to the selected byte immediately upon receipt of the selected byte by the network switch port. Rather, Deb relies on pipeline buffering to provide sequential execution of microcode instructions by an expensive processor in the MAC layer core. In Deb, words of a packet are sequentially received and temporarily stored in a pipeline register (see column 4, lines 33-48 of Deb). Deb discloses that a user

creates a data structure having a pointer to a selected 32 bit word of the incoming data packet. The analyzing computer 337 examines the selected word and the results of the comparisons are passed to the next address logic. Then, another word of interest is analyzed. (See Deb, column 14, line 24 to column 15, line 31). Claim 1 recites a step of comparing min terms to a selected byte and a step of generating a frame tag based on the comparison result as soon as a last bit of the data packet is received at the network switch port. A 32 bit word is not a byte. A byte is defined as 8 bits.

Hence, the rejection of claim 1, and the claims that depend there-from, is improper because it fails to demonstrate that Deb discloses each and every element of the claim. See MPEP 2131. "The identical invention must be shown in as complete detail as is contained in the ... claim." Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). "Anticipation cannot be predicated on teachings in the reference which are vague or based on conjecture." Studiengesellschaft Kohle mbH v. Dart Industries, Inc., 549 F. Supp. 716, 216 USPQ 381 (D. Del. 1982), aff'd., 726 F.2d 724, 220 USPQ 841 (Fed. Cir. 1984).

With regard to claim 11, this claim recites a min term memory configured for storing min term values, each min term value stored based on a location of a corresponding selected byte of the incoming data packet for comparison. Deb does not teach min terms stored based on a location of a corresponding selected byte of the incoming packet. Deb merely teaches at column 13, lines 21-23 that CAM 334 may contain a lookup table for use in matching data.

Claim 11 also recites a min term generator configured for simultaneously comparing a byte of the incoming data packet, immediately upon receipt of the incoming data byte, with the min terms that correspond to the received byte and generating respective min term comparison results. Deb does not disclose a min term generator configured for simultaneously comparing a byte of the incoming data packet as claimed since, as noted above, the processor 114 of Deb must perform sequential execution of instructions. Hence, the rejection of claim 11 and the claims that depend there-from is improper because it fails to demonstrate that Deb discloses each and every element of the claim.

Claims 7 and 16 stand rejected under 35. U.S. C. 103(a) as being unpatentable over Deb in view of Connery (US 6,570,884) and claim 10 stands rejected as being unpatentable over Deb in view of Bellenger (US 5,802,054). These claims depend from the independent claims 1 and 11 and are considered to be allowable for the reasons advanced above with regard to claims 1 and 11 and for the additional reasons that the added subject matter thereof is neither taught nor suggested by the prior art of record.

Conclusion

For the reasons set forth above, it is clear that the Appellant's claims 1-16 are not anticipated by Deb or obvious from Deb in view of Connery or Bellenger. Accordingly, it is respectfully submitted that the present invention should be properly patentable over these references. It is respectfully requested that this appeal be granted and that the Examiner be reversed.

Respectfully submitted,

By

Edward J. Stemberger
Reg. No.: 36,017
Tel. No.: 202.261.1014
Fax. No.: 202.887.0336

Customer No. 20736

APPENDIX — Claims on Appeal

1. (Original) A method of evaluating an incoming data packet at a network switch port, the method comprising:

storing a plurality of templates configured for identifying respective data formats, each template having at least one min term configured for comparing a corresponding prescribed value to a corresponding selected byte of the incoming data packet;

simultaneously comparing, to the selected byte, the min terms that correspond to the selected byte immediately upon receipt of the selected byte by the network switch port;

generating a comparison result that identifies the incoming data packet, based on the comparisons of the min terms to the data bytes of the entire packet received by the network switch port; and

generating a frame tag based on the comparison result as soon as a last bit of the data packet is received at the network switch port.

2. (Original) The method of claim 1, wherein the simultaneously comparing step includes:

loading the min terms corresponding to a first of the data bytes into a min term generator;

comparing in parallel the min terms loaded in the min term generator with the first of the data bytes; and

outputting comparison results for the min terms loaded in the min term generator to an evaluation core.

3. (Original) The method of claim 2, wherein the simultaneously comparing step further includes loading the min terms corresponding to a second of the data bytes, contiguously following the first of the data bytes, into the min term generator.

4. (Original) The method of claim 1, further comprising outputting the frame tag to a switch fabric configured for selectively switching the incoming data packet based on the corresponding frame tag.

5. (Previously Presented) The method of claim 1, wherein the storing step includes storing each min term in a memory as a table entry, each table entry having a location in the memory based on a location of the corresponding selected byte in the incoming data packet, the table entry including a min term portion specifying the corresponding prescribed value and a comparison operator field, and an evaluation portion having an equation identifier field that specifies the templates that use the corresponding min term.

6. (Original) The method of claim 5, wherein the generating step includes:

temporarily storing results of the comparisons of the min terms to the selected bytes of the incoming data packet;

detecting at least one matched template from the plurality of templates based on the results of the comparisons of the min terms; and

generating the comparison result based on the detected at least one matched template.

7. (Original) The method of claim 6, further including resolving a priority of templates to one final frame tag when more than one template matches the incoming data packet.

8. (Original) The method of claim 1, wherein the first of the data bytes corresponds to a first of the data bytes of a packet having a prescribed format, the simultaneously comparing step including evaluating the selected data byte relative to a beginning of the packet having the prescribed format.

9. (Original) The method of claim 8, wherein the prescribed format is Internet protocol (IP) format.

10. (Original) The method of claim 6, wherein the step of generating the comparison result based on the detected at least one matched template includes:

identifying for each of the min terms compared with the incoming data packet a corresponding equation, each equation specifying a unique result for a selected group of the templates; and

generating the comparison result by the equation having the detected at least one matched template.

11. (Previously Presented) A network switch port filter configured for evaluating an incoming data packet, comprising:

a min term memory configured for storing min term values, each min term value stored based on a location of a corresponding selected byte of the incoming data packet for comparison, a min term portion specifying a corresponding comparison operation, and an equation identifier field that specifies templates that use the corresponding min term;

a min term generator configured for simultaneously comparing a byte of the incoming data packet, immediately upon receipt of the incoming data byte, with the min terms that correspond to the received byte and generating respective min term comparison results; and

an equation core configured for generating a frame tag identifying the incoming data packet based on the min term comparison results relative to the templates.

12. (Original) The filter of claim 11, further comprising a frame identifier configured for identifying a type of layer 2 packet, the selected byte of the incoming data packet determined based on the identified type of layer 2 packet.

13. (Original) The filter of claim 12, wherein the location of each stored min term value is relative to a beginning of an IP frame within the layer 2 packet.

14. (Original) The filter of claim 13, further comprising a min term controller configured for fetching the min terms from the min term memory corresponding to a selected byte of the IP frame within the incoming data packet.

15. (Original) The filter of claim 11, wherein the equation core generates the frame tag at a wire rate of the incoming data packet and prior to an end of the incoming data packet.

16. (Original) The filter of claim 11, further including a tag priority device configured for resolving a priority of templates to one final frame tag value when more than one template matches the incoming data packet.